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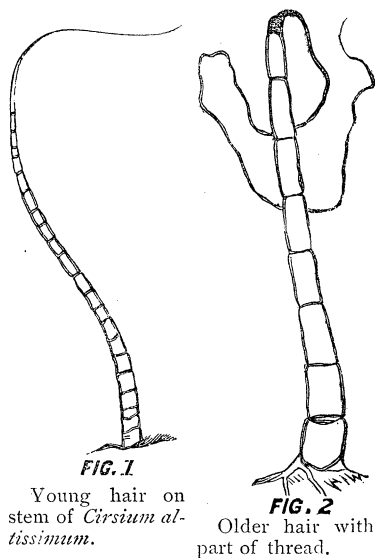
HOW THISTLES SPIN.

BY PROF. W. J. BEAL.

A HASTY glance at a plant of *Cirsium altissimum*, a very tall thistle, shows that the main stem, its branches, the midrib and prominent veins of the leaf are clothed with soft slender hairs. The entire under surface of the leaf is white or gray with a dense coat of cotton. The scales of the spiny-tipped involucre appear as if they were tied together by numerous gossamer threads. If the young leaves and buds are pulled apart many fine threads spin out an inch or more until the parts are separated far enough to break the threads.

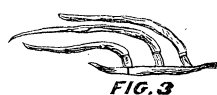
Under a magnifying power of one hundred diameters, the larger hairs, an eighth of an inch in length, are seen to be composed of a row of about fifteen cells placed end to end. The largest hairs are found on the stems and midribs.

At the top of the jointed hairs is a long lash, sometimes an inch in length which generally extends towards the tip of the leaf or stem. These hairs are very numerous, and stick more or less to each other. Fig. 1 is a good representation of one of these hairs while young, before it has been drawn out at the extremity. Fig. 2 represents a similar hair more highly magnified. In the latter case some of the cells have been used up to form the thread-like lash at the extremity.



In Fig. 1 the hair appears not to have acquired its growth. Near the base the cells are still very short, and not as they appear at the base of figure two. Some of the upper cells are slightly darker, and are filled with a yellowish-white mucilage. When young, the extreme cells are long, smooth and tapering. At that time they lie flat on each other, and are sticky and adhere to the tips of the hairs which they overlap. As the leaf or stem grows in length, the hair-stalks straighten up, and from the tip of each a thread is drawn out. In this process some of the cells are exhausted and used up in the thread.

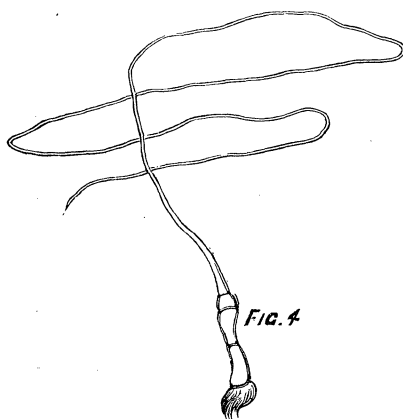
When the flower-bud is an eighth of an inch in diameter and one of the surrounding scales the twentieth of an inch in width, some of the hairs on the margin of the scale appear like Fig. 3,

**FIG. 3**

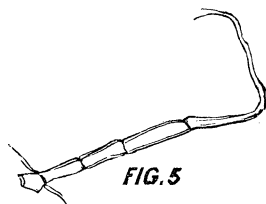
Margin of young scale of involucre.

where one short cell is tipped with another—long and slender. These tips are sticky and may be easily drawn out. As the buds expand, the tips of these hairs are caught

and drawn to the right or left by the scales next to them. When full grown the heads look as though a spider had spun webs round and round the outside. At this time

**FIG. 4**

the hairs appear like Figs. 4 and 5; where there is a long lash with one or two or rarely more cells at the base. Fig. 6 shows the edge of a scale of the involucre with one of

**FIG. 5**

Hairs on the back of a full-grown leaf.

these hairs, the part of another, and a couple of short prickles.

The webby layer of white or gray on the under side of the leaf is composed of cells similar to those last mentioned. They appear to grow in a similar manner. As the young leaf spreads and elongates, each hair draws out a thread which helps to cover the under surface with a dense web. This web adheres quite closely and firmly to the surface of the leaf.

The leaves of several other plants, like the Concord grape, Centaurias, etc., are covered in a manner similar to the leaf of the thistle. The branching hairs of the mullein and leaves of buttonwood, when very young, are like those of the thistle, only the extremities are not sticky.

In the New Testament we read, "Consider the lilies of the field, how they grow: they toil not, neither do they spin." This was not said of thistles nor of grape vines.

The thread of the thistle is single and slowly drawn out. Perhaps it may be called a clumsy affair when compared to the delicate cable of the spider, with its numerous strands. The thread of the thistle answers well enough the purposes for which it is intended. It

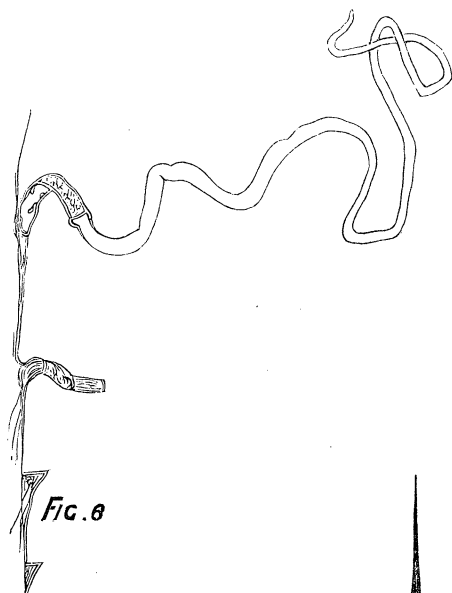


Fig. 6

protects the plant from sudden changes of weather, keeps the rain from wetting the surface, and probably to some extent keeps enemies from injuring the plant.

There is one other fact of interest about the thistle under consideration. When full-grown the scales about the heads of flowers have each an oblong gland just at the apex where the spine starts up. Fig. 7 shows this gland. The object of the gland I am as yet unable to determine. It may and probably does attract insects. It often entraps them. I have many times seen six to ten small flies and *Hymenoptera*, some of them half an inch in length, held fast by mouth or legs or wings. Here they buzz and twist and pull till strength and life are exhausted. Whether this is of any use to the plant for food or amusement, to keep away larger insects, or to attract spiders or ants, I have not yet ascertained.



FIG. 7

Scale of
C. altissi-
mum, show-
ing gland
at *a*.